

**METASEQUOIAMIRIS CARVALHOI, A NEW GENUS AND SPECIES OF
CONIFER-INHABITING MIRINI FROM CHINA
(HETEROPTERA: MIRIDAE: MIRINAE)**

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Abstract.—*Metasequoiamiris carvalhoi*, a new genus and species of mirine Miridae from West Hubei Province, China, is described and illustrated. This bug apparently inhabits the conifers *Cephalotaxus fortunei* Hook., *Metasequoia glyptostroboides* Hu and Cheng, and *Torreya* sp. The relationships of the new genus to other Mirini is discussed.

Key Words: Insecta, Heteroptera, Miridae, Mirini, *Metasequoiamiris*, new genus

While sorting unidentified Miridae from the California Academy of Sciences, San Francisco (CAS), I uncovered the first plant bug species known to inhabit *Metasequoia*. This new species of Mirini is reminiscent of *Orthops* Fieber and *Pinalitus* Kelton but has several features that require its placement in a new genus. *Metasequoiamiris carvalhoi*, new genus, new species, is described and documented, and its affinities to related Mirini genera are discussed.

It is appropriate that the recognition of a new genus, apparently the associate of an ancient and rare host plant, be included in this issue honoring our venerable and productive colleague, José C. M. Carvalho.

***Metasequoiamiris* Schwartz,
NEW GENUS
(Figs. 1–19)**

Type species.—*Metasequoiamiris carvalhoi*, new species.

Diagnosis.—Distinguished from other Mirini by the following combination of attributes: wide, pale collar, contrasting in color with dark calli (Fig. 1); campanulate pronotum (Figs. 1, 3); rounded, swollen frons and adjoining jugum, imperceptible dorsal

margin of tylus (Fig. 2); strongly punctate dorsum; nondeflected cuneus; long, sub-erect setae; convergent parempodial apices (Fig. 7); and long, trough-shaped sclerite of vesica (Fig. 14).

Description.—Male. Macropterous; general coloration castanaceous, with pale collar and abdominal sternites; dorsal surface strongly punctate, shining; head and scutellum smooth; dorsal vestiture consisting of uniformly distributed, long, fine, sub-erect, yellow setae; calli without setae, frons with sparse setae; pronotal and hemelytral setae set in punctures (Fig. 3). Head: triangular with tylus obscured by frons and posterior margin straight in dorsal view; frons and temporal area rounded, swollen anterior and dorsal to eyes; dorsal carina obsolete; tylus short with ventral margin not projecting anterior to dorsal junction in lateral view; antecular portion of head shorter than eye height; eye small, gena subequal to half eye height; labium reaching to apex of mesocoxa. Antenna: cylindrical, segments I and II of similar diameter, III and IV slightly narrower; inserted slightly ventral to middle of eye, fossa adjacent to anterior margin of eye; segment I longer than

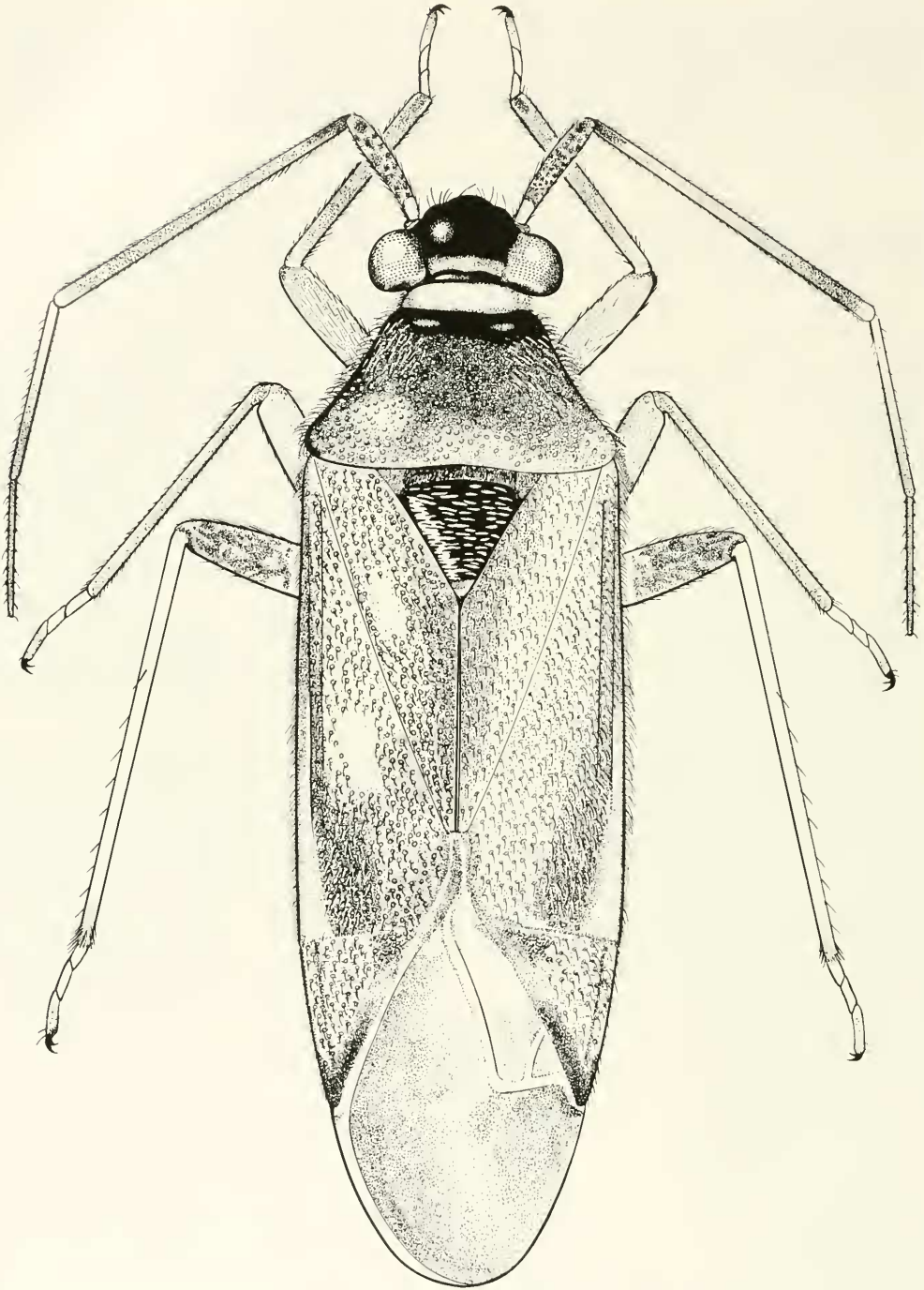
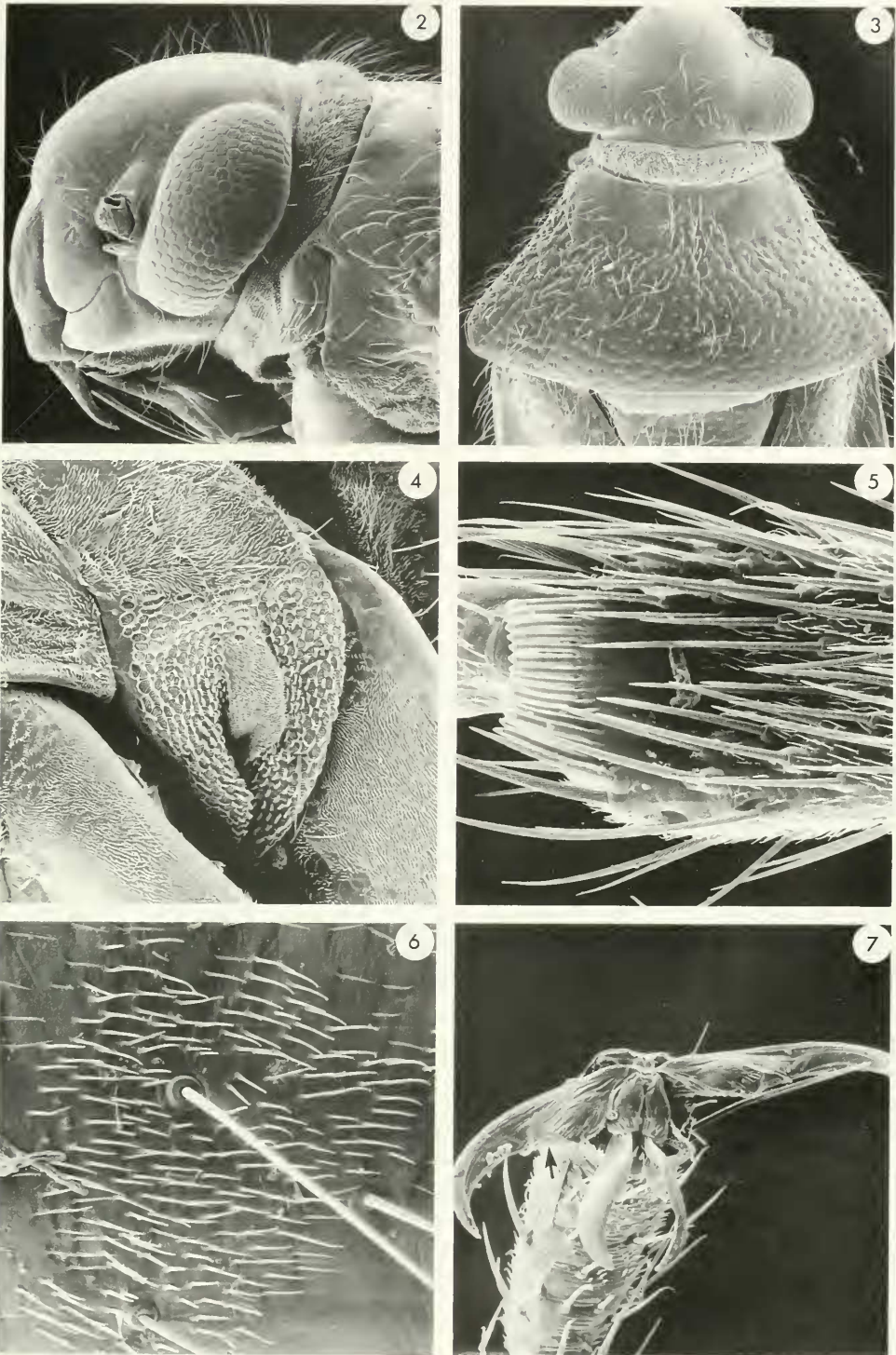
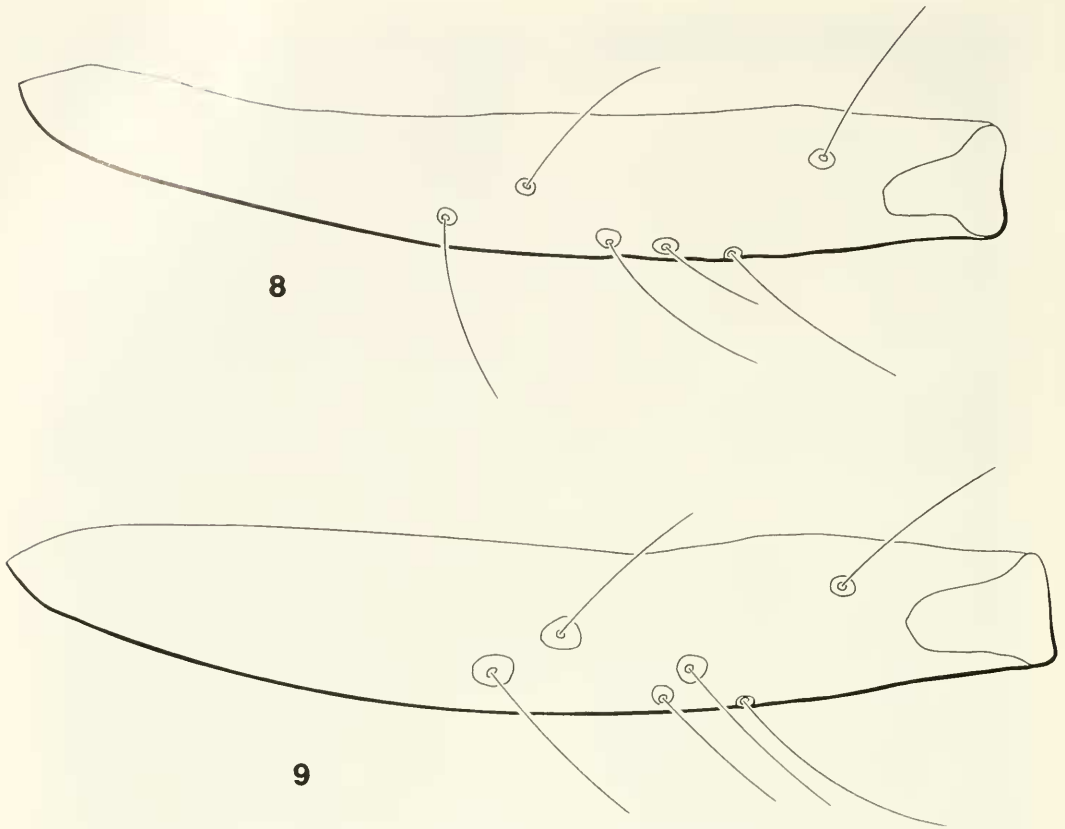


Fig. 1. *Metasequoiamiris carvalhoi*, n. sp., dorsal habitus of male.



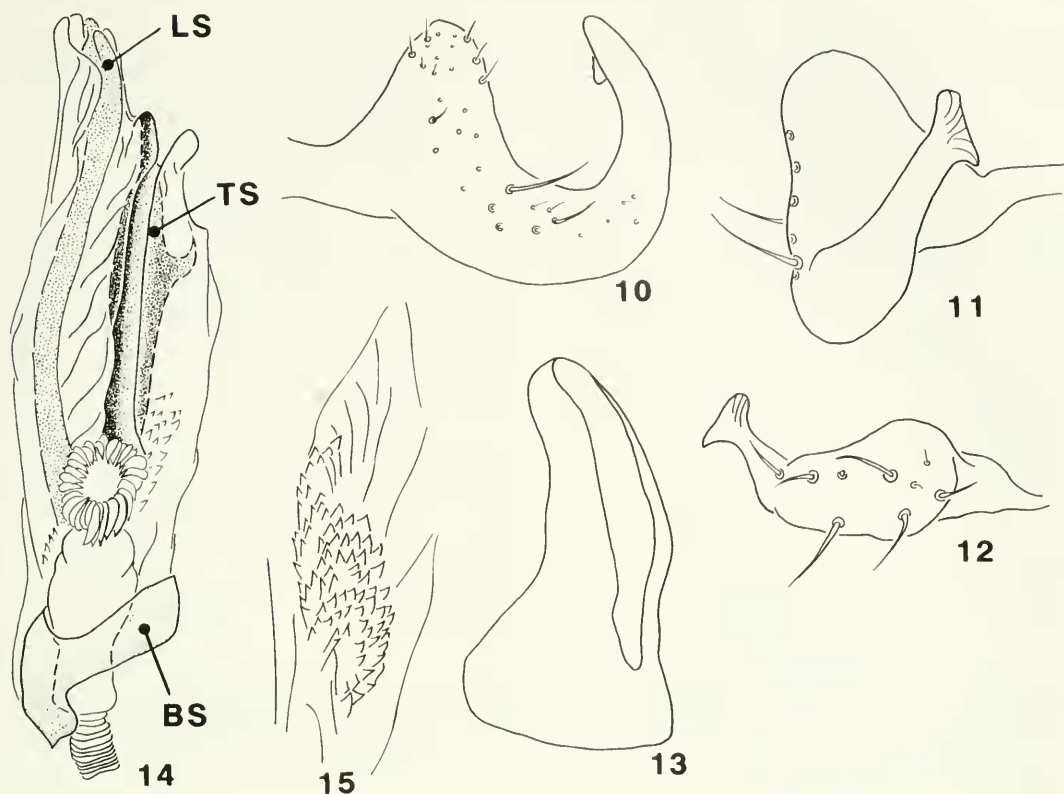
Figs. 2–7. Scanning electron micrographs of *Metasequoiamiris carvalhoi*. 2, head, lateral view; 3, pronotum and head, dorsal view; 4, metathoracic scent efferent system, lateral view; 5, apex of protibia, ventral view; 6, mesofemoral trichobothrium; 7, pretarsus, posterior view (pulvillus, arrow).



Figs. 8, 9. Metafemoral trichobothria of *Metasequoiamiris carvalhoi*, ventral view. 8, male; 9, female.

width of vertex, segment II just longer than posterior width of pronotum, segment III longer than IV; all segments with reclining dark setae, segments III and IV also with a few longer, suberect setae. Pronotum: campanulate; collar wider than width of antennal segment I, with dense trichomae (Fig. 2), anterior margin slightly concave medially; calli flat, separated medially, reaching lateral margins of pronotum. Scutellum: weakly elevated. Metathoracic scent efferent system: triangular evaporative area; peritremal disc small, slightly raised; disc and adjacent metapleuron densely pubescent (Fig. 4). Hemelytra: elongate, parallel-sided, surpassing genital segment in lateral view, declivous at cubitus; embolium obsolete; cuneus about two times as long as broad, not bent ventral to corium; cuneal fracture

small; primary cell much longer than broad, secondary cell narrow. Legs: with moderately distributed, suberect, shining, pale setae; femora slightly fusiform with oval cross-section; metafemora with 6 trichobothria (Fig. 8), trichomae strongly developed (Fig. 6); tibiae cylindrical, protibia with concave apex and comb (Fig. 5); tarsi three-segmented, segment 3 subequal to combined length of 1 and 2; pretarsus with small, curved claws; lamellate parempodia with convergent apices; pulvilli apparently absent (Fig. 7 cf. arrow). Genitalia: *Genital capsule*: without tubercles dorsal to paramere insertions; aperture oval. *Left paramere*: C-shaped (Fig. 10). *Right paramere*: narrow distally (Fig. 12). *Phallosome*: horn-shaped, without apical spines or tubercles, aperture almost reaching base (Fig. 13). *Ve-*



Figs. 10–15. Male genitalia of *Metasequoiamiris carvalhoi*. 10, 11, left paramere. 10, lateral view; 11, distal view; 12, right paramere, lateral view; 13, phallosome, lateral view; 14, 15, vesica. 14, posterior view (BS, basal sclerite; LS, lobal sclerite; TS, trough-shaped distal portion of basal sclerite); 15, anterior view.

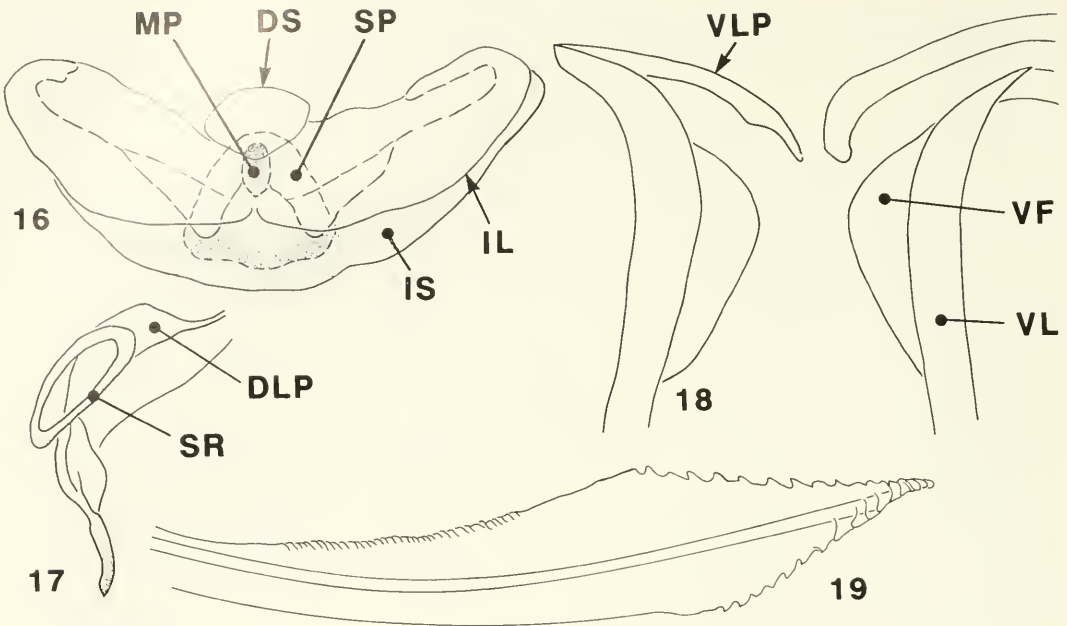
sica: ductus seminis slightly thickened medially; aperture of secondary gonopore oval and complete; basal sclerite trough-shaped and lobal sclerite narrow (Fig. 14).

Female.—Macropterous; similar to male in color and structure, except apex of protibia with deeper concavity. Legs: metafemora with 6 trichobothria (Fig. 9). Genitalia: *Posterior wall*: narrow, with lateral apices strongly recurved (Fig. 16, IS). *Lateral lobe*: absent. *Median process*: present (Fig. 16, MP). *Dorsal structure*: oval (Fig. 16). *Sclerotized rings*: small, flattened oval (Fig. 17, SR). *Dorsal labiate plate*: continuous, narrow and indistinct medially (Fig. 17, DLP). *Ventral labiate plate*: discontinuous (Fig. 18, VLP). *First valvulae*: distal serrations coarse (Fig. 19).

Distribution.—All known specimens are from Lichuan district, West Hubei province, China.

Etymology.—Named for one of the host plants, *Metasequoia glyptostroboides*.

Discussion.—The campanulate pronotum, parallel-sided, elongate hemelytra, nondeflected cuneus, and convergent parmpodia of *Metasequoiamiris* are similar in appearance to the Neotropical orthotyline genus *Falconia* Distant. However the new genus is clearly placed in the Mirini and possesses characters which show a relationship to some of the genera examined by Schwartz (1994). The addition of the new genus to the data set and analysis in Schwartz (1994, Table 1; coded for characters 0 to 36 as follows: 00001 20000 00010 10033 13301



Figs. 16–19. Female genitalia of *Metasequoiamiris carvalhoi*. 16, posterior wall, anterior view (DS, dorsal structure; IL, inter-ramal lobe; IS, inter-ramal sclerite; MP, median process; SP, shovel-shaped anterior surface of median process); 17, left sclerotized ring, dorsoposterior view (DLP, dorsal labiate plate; SR, sclerotized ring); 18, ventral labiate plate, anterior view (VF, first valvifer; VL, first valvulae; VLP, ventral labiate plate); 19, distal end of first valvulae, lateral view.

35141 21401 00) produces one most parsimonious cladogram (length = 114, ci = 72, ri = 72, after removal of uninformative characters and successive approximations weighting of two resultant equally parsimonious cladograms) with a structure which places *Metasequoiamiris* as the sister genus to the monophyletic taxa forming node 5 (Schwartz 1994, Fig. 29). *Metasequoiamiris*, *Orthops*, *Pinalitus*, *Salignus* Kelton, and *Oreolygus* Linnavuori form a group based on the possession of the following characters: white pronotal collar (Fig. 1); left paramere with tapered shaft (Fig. 11); narrow inter-ramal sclerite with recurved lateral apices (Fig. 16); and small, oval sclerotized rings (Fig. 17) (the left paramere and sclerotized rings are homoplasious in *Orthops* and the collar and inter-ramal sclerite are homoplasious in *Salignus*). The vesica of the new genus is most similar to *Orthops* in the structure of the posterior lobe of the

basal sclerite. The strongly developed metafemoral trichomae and apparent absence of pretarsal pulvilli, in addition to the suite of characters listed in the Diagnosis of *Metasequoiamiris*, are unusual for the Mirini. The utility of the hypothesized relationships of the “*Lygus* complex” genera presented here and in Schwartz (1994) can be properly addressed only with a comprehensive analysis of the tribe.

The presence of lamelliform parempodia with either divergent or convergent apices has been used as a diagnostic feature of the Mirinae and Orthotylinae respectively (Knight 1968). That there is variation in the two subfamilial forms of lamelliform parempodia is well known (see Figs. 54–67 in Knight 1968). *Closterocoris* Uhler and *Cyphopelta* Van Duzee in the Herdoniini have narrow, straplike lamelliform parempodia which resemble the setiform parempodia of Phylini. Mirini with convergent parempo-

dia, like those in *Metasequoiamiris*, have not been documented previously.

Metasequoiamiris carvalhoi,
Schwartz, NEW SPECIES
(Figs. 1–19)

Description.—Castanaceous with variable brown to black areas on head, antennal segments II–IV (except base of II), anterior portion of pronotum (calli always) including disk laterally, proepisternum, propleuron, mesoscutellum, scutellum, near claval commissure, distal one-third of cubitus, meso and metasternite, anterior portion of evaporative area of metathoracic scent efferent system, abdominal segment 2, rest of abdominal sternite laterally, and genital segment; pale yellow on legs, labium, posterior portion of evaporative area of metathoracic scent efferent system, and abdominal sternites 3–8 medially; orange to red on interior and distal lateral margins of cuneus, distal half of metatibia, and most of antennal segment I; hemelytral membrane dusky brown. Genitalia: *Left paramere*: sensory lobe prominent, without apical spines, with short setae (Fig. 10); arm and angle C-shaped, with short to moderate length setae; shaft short and tapered; apex with rounded dorsal point and sharp ventral point (Fig. 11). *Right paramere*: with broadly rounded sensory area, with moderate length setae; distal one-third a narrow shaft; apex with rounded dorsal point and sharp ventral point (Fig. 12). *Vesica*: Basal sclerite: narrowly enveloping base of vesica (Fig. 14, BS); anterior lobe continuing posterior to ductus seminis and secondary gonopore as a narrow, trough-shaped sclerite terminating at edge of membrane (Fig. 14, TS); posterior lobe forming a strongly spinulose patch posterior to secondary gonopore (Fig. 15). Membrane: reduced dorsal to secondary gonopore, associated with basal portion of the lobal sclerite. Lobal sclerite: long, curved, attached at base of vesica projecting dorsally beyond membrane and apex of basal sclerite, without spines (Fig. 14, LS).

Measurements (in mm; $n = 20$).—Length from apex of tylus to apices of membrane 3.49–4.10; length from apex of tylus to cuneal fracture 2.66–2.91; width across hemelytra at apex of clavus 1.09–1.26; posterior width of pronotum 1.13–1.23; width of head across eyes 0.73–0.76; width of vertex 0.34–0.38; length of antennal segment I 0.41–0.46; II 1.18–1.28; III 0.59–0.73; IV 0.53–0.58; length of labium 1.08–1.16.

Female.—Color similar to male. Genitalia: *Posterior wall*: Inter-ramal sclerite: narrow, ventral margin broadly rounded, sclerite deeply incised on both sides of median process (but with membrane); lateral apices strongly recurved (Fig. 16, IS). Inter-ramal lobe: broadly contiguous medially, broadly rounded ventrally (Fig. 16, IL). Median process: well-sclerotized, with broad shovel-shaped anterior surface (Fig. 16, MP, SP). Dorsal structure: edge not extending beyond width of shovel-like median process (Fig. 16, DS). *Dorsal labiate plate*: width equal to width of rings (Fig. 17, DLP).

Measurements ($n = 20$).—Length from apex of tylus to apices of membrane 4.10–4.43; length from tylus to cuneal fracture 2.85–3.10; width across hemelytra at apex of clavus 1.28–1.40; posterior width of pronotum 1.18–1.30; width of head across eyes 0.73–0.76; width of vertex 0.38–0.41; length of antennal segment I 0.38–0.43; II 0.95–1.07; III 0.60–0.66; IV 0.54–0.60; length of labium 1.28–1.40.

Distribution.—All known specimens are from Lichuan District, West Hubei Province, China, a region with a distinctive floral association (Chu and Cooper 1950, Wang 1961).

Etymology.—Named to honor the late José C. M. Carvalho in appreciation of his long and productive career devoted to the systematics of the Miridae.

Holotype male.—China. *West Hupeh*: [West Hubei, Lichuan District:] Suisapa [Shui-hua-pa], [1000 m], 25 July 1948, J. L. Gressitt Collector, ex. *Torreya* sp. (deposited in the CAS).

Paratypes.—All with the same label data as the holotype except as follows—24 July: 1 ♂, 2 ♀ [1 ♀ dissected]; ex. *Castanea* sp., 1 ♂ [metafemora dissected, Fig. 8]; ex. *Cephalotaxus fortunei* (possibly a *Torreya*—sterile), 2 ♂, 4 ♀ [♂ used in Fig. 1]. 25 July: 2 ♀; ex. *Metasequoia glyptostroboides* Hu and Cheng, 3 ♂, 1 ♀; ex. *Torreya* sp., 1 ♂, 3 ♀; ex. *C. fortunei* (possibly a *Torreya*—sterile), 14 ♂, 7 ♀ [2 ♂ used in Fig. 1]. 26 July, 1 ♂. 1 Aug., #2401, ex. *M. glyptostroboides*, Bishop Museum, 1 ♂, 7 ♀, 30 Aug.: ex. *C. fortunei* (possibly a *Torreya*—sterile), 1 ♂, 29 ♀ [♂ dissected, Figs. 10–15; 1 ♀ SEM #189a, Fig. 7]; ex. *M. glyptostroboides*, 3 ♀ [metafemora dissected, Fig. 9]. 12 Sept.: ex. *C. fortunei* (possibly a *Torreya*—sterile), 20 ♀; ex. *Liquidambar formosana* Hance, 1 ♀. 17 Sept., 1 ♀ [dissected, Figs. 16–19]. China. *West Hubei*: Lichuan District: Leong-Ho-Kow, 9 Sept. 1948, ex. *C. fortunei* (possibly a *Torreya*—sterile), 1 ♀. Voucher specimens are deposited in the American Museum of Natural History, New York, NY; Bishop Museum, Honolulu, HI; CAS; Canadian National Collection, Ottawa (CNC); Nankai University, Tianjin; Natural History Museum, London; and U.S. National Museum, Washington, D.C.

Other specimens.—All with the same label data as the *Suisapa* paratypes from the following dates. The specimens are not included in the type series because they are either damaged or teneral—24 July 1 ♀; 25 July 3 ♂ [1 ♂ SEM #288b; Fig. 6], 3 ♀; 26 July 5 ♂, 1 ♀; 1 Aug. 3 ♀; 30 Aug. 3 ♂ [1 ♂ SEM #288a, Figs. 2–5], 4 ♀; 12 Sept. 15 ♀ (CAS, CNC).

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